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EUROPEAN PATENT APPLICATION

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(54) **Connecting unit and method for establishing a data connection**

(57) The invention pertains to a connecting unit (3) for establishing a data connection between two data processing installations, which, in dependency on a first (2) data processing installation, initiates the connection with a second data processing installation for the transmission of a data element stored on it, whereby the second data processing installation and its requested data element are designated by the first data processing installation by means of an address. A convenient and compatible connecting unit (6) is to be created, particularly for data connections with special performance features, such as special speeds, fees or special security, for example. This is done by means of a connecting unit with an address generator, which, in dependency on the requested address, generates a second address and initiates the establishment of the data connection to the data processing installation and its data element designated by the second address. By doing this, it becomes possible for the type of connection to satisfy the special requirements of the requested data element through the selection of the second address and the initiating of the establishment of the connection.
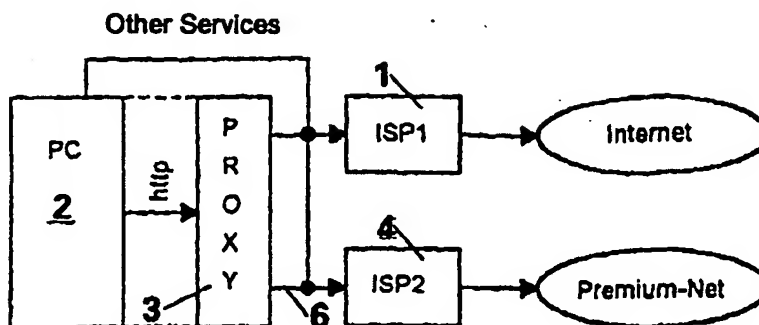
Other Services

Fig. 1

Description

[0001] The invention pertains to a connecting unit for establishing a data connection between two data processing installations, which, in dependency on a request from a first data processing installation, establishes the connection with a second data processing installation for the transmission of a data element stored on it, whereby the second data processing installation and its requested data element are designated by the first data processing installation by means of an address. In the same way, the invention pertains to a method for establishing a data connection between two data processing installations, which, upon a request from a first data processing installation for the transmission of a data element stored on the second data processing installation, initiates an establishment of the data connection, whereby the second data processing installation and its requested data element are designated by an address. Numbered among data processing installations are all arrangements by means of which data connections can be established, specifically including computers, computer terminals and logically addressable mass storage. The data elements include files, programs and program elements, scripts, data streams and other elements that can be exchanged over data connections.

[0002] With the emergence of inexpensive computing power, completely new applications and areas of use were created for data processing installations. Rapid technological development is taking place in the networking field in particular. It must now be assumed that data networks such as the Internet, for example, will draw an increasing number of users worldwide and become a general means of communication along with the telephone network. One of the reasons for the great technical success of the Internet is the fact that data is sent from network node to network node in the form of addressed packets. As a result, a central structure based on a topology or an instance that distributes the data elements flowing through the network are eliminated. The data connections within the network are thus robust against malfunctions and errors that occur in the network. However, the establishment of data connections in such a data network poses a number of technical problems, particularly if special requirements are placed on the data connection. The problems occur particularly in a packet network like the Internet in which a data element, cut up into packets, finds its way through the network.

[0003] In the past, a number of solutions have been suggested in order to be able to place special requirements on the data connection within a network. Special requirements on a data connection include, for example, the screening of the data transmission against unauthorized third parties, the bandwidth of the data connection, and the possibility of charging fees for the data connection. Sometimes, these features are also summarized as quality of service (QOS),

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and in this context one then speaks of QOS data connections or QOS networks. The creation of QOS data connections as an option in the provision of special data connections is desirable in order to provide special services such as the transmission of sound and picture data or the option of querying fee-based databases.

[0004] It generally holds true that within the data network, a user utilizes his computer to ask a second computer for a data element that interests him, such as a file of a continuously transmitted data stream, for example. This request follows a protocol that allows a connecting device to establish the desired connection or to cause its establishment. Protocols that are in widespread use on the Internet include, for example, the hyper text transport protocol (http), the file transfer protocol (ftp) and the real audio protocol. As an especially user-friendly configuration on the Internet and the World Wide Web that is placed on it, the request for a data connection for a data element at a data processing installation includes a unique address, the so-called uniform resource locator (URL). A unique address is assigned to each directly available data element. In this regard, the structure of the URL addresses is subject to a fixed syntax, according to which the protocol is indicated at the beginning, and then a computer that is designated by a name within a domain. The designation of the domain is usually structured hierarchically using one or more domain names. Attached to the designations of the computer in the URL address is the more exact identification of the requested data element, for example, in the form of a relative index structure with a file name on the computer. If no data elements are given, a search is made within the index structure for default files that are stipulated in fixed fashion. With the aid of a URL address, each available data element can be reached for transmission over a data connection. Parameters that are introduced at the beginning with a question mark for a request – a so-called query – , with a double cross for a subaddress or a label, or a semicolon for other parameters, can be appended to a URL address. For example, the parameters can be turned over to the data element as a kind of external program parameter, thus affecting the running of the data elements when it is activated.

[0005] It is known in the state of the art that, by means of a message sent to the user in the form of a text message, for example, he can be instructed concerning additional steps to be initiated if a data element that requires a special data connection is part of the requested address. For example, he will be told of the option of setting up an account for the fees with the information provider. It also happens that the user will be asked to give his credit card number via the data network or separately by fax so that the information provider can settle accounts with him directly. Establishment of the requested data connection takes place after the user has carried out the requested steps. Such establishment of a data connection is not secure for the user, since he must make data for settling the account available to the information provider. In addition, the fact that he has no certainty regarding the authenticity of the user information is disadvantageous for the information provider.

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[0006] A somewhat advanced method is already known from US Patent Specification 5,737,414. Here, the fee-recording of the telephone network is used in order to establish a fee-based connection. When a fee-based data connection is established, the user is asked to call a special telephone number on which provider fees are payable along with the usual connection fees. Fees for the data connection are then charged with this telephone call. To do this, it is necessary that the computer providing the requested data element receives an access report concerning the completed call at the telephone number with the fee recording. After the access report is received, it makes the requested data element available for the data connection. The access report thus directly forms a counter-value in the data network, since it causes the queried computer to make available fee-based data elements. The information provider charges his fees for making the data element available by using the provider fees incurred for the telephone call. With this kind of fee accounting, it is required for security reasons that access reports and additional reports that trigger a providing of the data elements be encoded. What is disadvantageous about this first of all, is the fact that the channel for the data connection and the channel for the recording of fees, i.e., a total of two channels, are busy at the user. Also considered to be disadvantageous is security that is based on cryptographic processes, since encoding requires a disproportionately large amount of time and computing power with increasing levels of encoding, and in principle it remains insecure with the known encoding techniques.

[0007] These disadvantages are partially eliminated by the method described in Unexamined Patent Application EP 0 818 907 A2 and termed Fusionnet. In the network suggested there, a server termed the Fusionnet server is provided, which establishes a telephone connection from itself to the user upon the request for a specific data connection. First, the Fusionnet server establishes a data connection to the requested data element. Then it establishes a connection with the user in order to forward the data element to him. The Fusionnet server uses the telephone network again to establish this data connection. To establish the connection, a call is received by the Fusionnet server from the user's computer over a telephone number with provider fees, or the Fusionnet server establishes a connection to the user's computer via a collect call. In doing that, it is disadvantageous for security reasons that a server with data from querying users at its disposal is provided in the data network in order to establish a fee-based connection. The security aspect is particularly problematic when data connections via telephone connections with provider fees charged to the user are established through the server itself. Moreover, the technical demands on the Fusionnet server are very high, since in the worst case it has to supervise a number of data connections with special requirements simultaneously and make the data elements available.

[0008] Starting from this state of the art, the invention is based on the task of making available a connecting unit and a method for connection control that can quickly, easily and securely

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establish for a data element requested in the data network a special data connection that is dependent on the data element.

[0009] According to the invention, the connecting unit mentioned at the beginning is provided with an address generator that generates a second address that is dependent on the first address, and initiates the establishment of the data connection to the data processing installation and its data element designated by the second address. The address generator transforms the requested address into a second address. Since the result of the transformation, i.e., the second address, is again a permissible address, the connecting unit according to the invention can continue to make use of known transmission and addressing techniques to initiate the connection to the second address. As a result, the connecting unit according to the invention can also work in a conventional packet network such as the Internet. The connecting unit initiates the establishment of the data connection within the network in the conventional, known way by forwarding the second address. When a second address is being used, it is also particularly advantageous that the connecting units according to the invention not interfere with the existing data network. That is because, with a data connection established by the connecting unit according to the invention, the conventional addresses are utilized and no incompatible elements are introduced into the address. The generating of the second address takes place in dependency on the requested address. In doing this, many different options exist for developing these dependencies. Because the requested address emanates from the first data processing installation, the address generator is able to generate the second address in dependency on the requesting data processing installation. Since as a rule the user does not make a new entry of the address at the first data processing installation, but instead the address is sent to him earlier by another data processing installation, in the form of a connection pointer, a so-called link, for example, the address generator can also generate the second address in dependency on the configuration of the transferred address, i.e., in dependency on information stored on the other data processing installation. This means that the second address, which was generated in dependency on the requested address, can thus be defined by the requesting data processing installation, and by the information provider that originally disclosed the requested address, or by both jointly. In the case of the Internet and its World Wide Web, it means that a requested URL is transformed into a second URL in dependency on its content, and the establishment of a data connection to the data element designated by the second URL address is initiated. The connecting unit according to the invention offers the option of establishing flexible data connections with special requirements within an existing network, since the target address for a data element is variable and can be generated according to the special requirements. Generation or transformation should not include a decoding of a URL into an IP address, since only the presentation format of the same address is changed during decoding. Using the terms of the OSI Reference Model (Open System Interconnection

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Reference Model) that is based on a suggestion of the ISO (International Standards Organization), here the addresses should be generated within one layer and, unlike the case of routing, which takes place in a lower layer, such as the network layer or the transport layer, they should not be coded and decoded. In particular, the second addresses that are to be generated should emanate from the top layer—i.e., the application layer in the OSI Reference Model; and follow its protocols so that the well-proven layers of the network and their techniques can be used to establish the data connections.

[0010] To simplify implementation within the network, at least the address generator can be an integral part of the first data processing installation. In that case, the address generator can be present in the form of a circuit on a plug-in card for the first data processing installation. Alternatively, in the form of a method it can also operate data processing installation components that are already available. What is important here if the address generator is an integral part of the requesting data processing installation is that it not require any additional changes in the data network. The URL address, which in the case of the World Wide Web is sent by an operator program such as an Internet browser, for example, is transformed into a second URL address by the address generator on the requesting computer before it leaves the computer and is forwarded to connecting units such as POP dial-up points (point of presence dial-up points) of an Internet provider. Therefore, no intervention is made in the existing way of establishing a data connection. The connecting unit according to the invention can be provided additionally on any existing data processing installation without having to intervene in an essential way in its existing elements for establishing a data connection.

[0011] In order to be able to meet special requirements on a data connection, it is advantageous that at least one leg of the data connection consists of a telephone connection in a telephone network. Included in telephone connections here are dial-up lines in the telephone network in particular. A data connection between two different data processing installations can avail itself of many communication channels. For example, specially designed data networks, telephone networks and radio or satellite links can be used alongside each other. In doing this, it is not necessary for a connection path to exist simultaneously; instead, it is common to provide buffers in the data network, for example, with cache functions or as proxy servers, in order to reduce the communication effort. The buffers, which keep a copy of data elements such as frequently requested files or data elements that are especially large, make a simultaneous connection of all of the computers along the path unnecessary. While the connecting unit advantageously always makes use of a telephone connection in at least one section, at a minimum of one location of the data connection the connecting unit has available known and defined connection parameters that can be taken into account in establishing the special data connection. Particularly in the case of a computer that dials into the Internet via the public

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telephone network with a modem or via an ISDN interface, a telephone connection is usually present.

[0012] In an especially preferred execution of the invention, the address generator initiates the establishment of the data connection for the second address via a predefined telephone connection that differs from a conventional connection in at least one performance feature. Here, the address generator intervenes in the establishment of the data connection in that it establishes a predefined telephone connection for the data connection to the generated second address. The connecting unit according to the invention makes it possible to generate a second address in dependency on the requested address and to establish the connection to the data processing installation designated by the second address, partly over a special telephone connection. When this is done, the telephone connection is initiated by the address generator. All of the factors that directly initiate the establishment of a special telephone connection are in the requesting data processing installation. Security problems in this regard are eliminated, because the establishment of the connection is initiated and controlled solely by the requesting data processing installation. A further advantage of the connection establishment initiated by the address generator over a predefined telephone connection is the fact that this connection establishment can again take place jointly with the existing components and techniques. The basic establishment of the data connection remains the same, only one section of the data connection takes place over a predefined telephone connection. Particularly in the case of a data processing installation that is connected via the public telephone network with a POP dial-in point of an Internet provider, the action of the data processing installation that is provided with the connecting unit according to the invention remains hidden. That is because only the second address is passed along over the predefined telephone connection, so that no changes are required for establishing the data connection. In the case of the data processing installation designated by the second address, the information can be present that the data connection for the designated data element exists partly over the predefined telephone connection. In doing this, it is especially advantageous if the predefined telephone connection is made directly to the data processing installation, i.e., the requesting data processing installation is connected by the connecting unit directly to the data processing installation that contains the data element designated by the second address.

[0013] The data connection established in this way advantageously utilizes the entire available bandwidth of the predefined telephone connection. In this regard, the effective available transmission capacity of the telephone connection including an interface to the data processing installation is viewed as the bandwidth of the telephone connection. In the case of the data processing installation designated by the second address, it is known that the requested data element is being queried via a special telephone connection, therefore the data element can be made available and transmitted making full use of this information.

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[0014] An additional advantageous feature of the connecting unit according to the invention consists in the fact that for the establishment of the predefined telephone connection, the address generator disconnects the existing telephone connection. As a result of the prior disconnecting of an already existing telephone connection, only one telephone line is required, even with a change to a telephone connection with special performance features. Special performance features can be that a provider remuneration is incurred for the telephone connection, special encoding and/or compression processes are executed on the telephone connection, or that the telephone connection has a different bandwidth depending on the requirement of the data element. Among the special performance features of the telephone connections that can also be offered with the connecting unit according to the invention are variable bandwidths such as are made possible by an ATM connection (asynchronous transfer mode connection), for example, guaranteed connection availability and reliability, especially brief answer/access time (the latency of the connection), portability of the connection to the extent that as a result of special situations a connection can be established over the mobile network, for example. Also possible as special performance features are, among others, call forwarding, call routing that is, for example, time-dependent, and the selection of connections with special measurement options and the sending of subscriber data, as well as connections that allow caller ID as a special feature. In the case of a telephone connection on which provider fees are payable, the provision of data elements via the data network can be billed without any kind of payment information or other digital payment units being forwarded through the network. The provider of fee-based information on the data network is able to offer it in the usual way. Only when the connection to it is to be established does the call establishment take place partly over a telephone connection on which provider fees are payable. The provider fees occur as soon as the connection to the provider is established, and their recording ends when access to the offered data elements is no longer being made, because the call is then disconnected again. Unlike an Internet connection, such a telephone connection, also known as a point-to-point connection, can be intercepted by unauthorized third parties only with great difficulty. Particularly in the case of direct dial-up, in the data processing installation designated by the second address, the access takes place with no possibility of diversion of billing, and the fee recording begins with no significant time delay.

[0015] When the address generator initiates the establishment of the disconnected connection again, it is expedient if no special performance feature is required for the requested address. As a result, the connection with the special features is used only if the performance features are needed.

[0016] To ensure the quality of the data connection, the second address generated by the address generator designates a data processing installation within a subnetwork. Because the connecting unit according to the invention as explained above does not intervene in the existing

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network, and the second address follows the protocol in question, the data processing installation designated by the second address can be integrated into the data network in the usual way. However, if data elements are to be transmitted exclusively over a data connection established according to the invention, it is then necessary that the data processing installations form a logical subnetwork, i.e., a branch of the network graph that does not link into more than one node, whereby each of the requesting data processing installations represents a link node. It is thus possible to switch into the subnetwork only through the connecting unit according to the invention. There are two alternatives when this is done: In a first alternative, the data elements that require a special connection have a double presence in the network, and the user can choose whether the connection to the second address generated by the address generator is established. In the second alternative, the data element is available in only one of the data processing installations within the subnetwork, and can be called from there only through the connecting unit.

[0017] To generate the second address, the address generator can contain a list of address allocations that assign to each second address at least one address that, when requested, will generate the second address. For example, if the URL address http://www.EPA.eu/Document1.html is requested, and if in the address list of the address generator the second URL address http://www.provider.de.EPA.eu/D1.html is assigned to that URL address, the second URL address will be generated and the establishment of the connection to it will be initiated. The advantage of such a list consists in the fact that it is possible to make individual allocations through the address generator. In this way, the address generator can create individual second addresses. An updating of the second addresses can then be carried out by changing individual allocations, or by replacing the entire list in the address generator of the connecting unit.

[0018] It is also expedient for the address generator if the address coming into the address generator contains parameters that initiate the generating of the second address and determines the second address. In this kind of dependency of the second address on the original address, the incoming first address contains parameters with a syntax that defines the second address. It is advantageous for the parameters to have no effect on the components that are already present in the network and establish the data connections. In addition, they make it possible for the information provider to determine the second address himself by following the syntax of the address generator in his address. If the connecting unit according to the invention is not being used, the parameters are not taken into account and a conventional data connection is established; if, on the other hand, a connecting unit according to the invention is being used, it can establish the data connection to the second address chosen by the information provider.

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[0019] The task on which the invention is based is also solved by means of the method above, in which a second address is generated in dependency on the requested address, and the establishment of the data connection to the data processing installation designated by the second address and its data element is initiated. The method according to the invention can run on a connecting unit, e.g., a PROXY server, on connecting units specially provided in the network for that purpose, etc. The method causes the establishing of a data connection with a data processing installation that is designated differently than the requested data processing installation. Because the second address is generated in dependency on the requested address, a special data connection that is designed for the requested special data element can be established with the second address.

[0020] It is especially advantageous if the second address is generated by the requesting data processing installation. The method can run on the data processing installation, and there it can receive addresses requested for a data connection and transform them into second addresses in dependency on them.

[0021] In order to be able to affect the quality of the data connection more easily, the establishment of the data connection to the data processing installation designated by the second address takes place at least partially over a predefined telephone connection. Thus, in a first step there is recognition of whether a second address is to be generated for the requested address, in a second step the second address is generated in dependency on the first address, and accompanying this in a third step, a predetermined telephone connection is to be established for the data connection to the data processing installation designated by the second address. This method is secure against misuse, since the predetermined telephone connection is established independently of the possibly falsified identity of the user.

[0022] Particularly expedient are the two additional method steps, according to which, in the case of a requested address for which a second address is being generated, an already existing telephone connection that does not match the predefined telephone connection is disconnected, and then the predefined telephone connection is established by dialing a corresponding telephone number from the requesting data processing installation. These two method steps ensure that the communication is not interrupted for an unnecessarily long time. The appropriate connection is established for the user without his being able to detect the selected data connection. When establishing the predefined telephone connection, several telephone numbers can be used one after the other in order to be able to establish the predefined telephone connection quickly in the event that a telephone number is busy.

[0023] For example, to pay for the data connection that has been made available, it is especially beneficial if the predefined telephone connection has special performance features. In particular, it is beneficial if provider fees are also charged in addition to the connection fees for the predefined telephone connection. Such a connection ensures great security for both

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parties. When fee-based information is being requested, the requesting computer dials the fee-based telephone number. This way, the costs can be reviewed and controlled independently at any time by the user of the requesting data processing installation. With this method, the provider has security that the fees for the requested data elements are also being recorded and that he will receive his share of the provider fees. As additional security, it is also possible to provide the method step that the user must expressly confirm the establishment of the fee-based telephone connection one more time.

[0024] In a version of the method according to the invention that is especially easy to implement, at least one performance feature for the data connection is defined by parameters of the incoming address, and the predefined telephone connection is selected with appropriate performance features in dependency on the parameters. For the fee recording, the provider fee that is payable for the data connection is defined by parameters of the incoming address, and the predefined telephone connection with the appropriate provider fee is selected in dependency on the parameters. Several parameters can be sent along with the incoming address. Parameters for specifying the scale of charges, the bandwidth, or the key for encoding can also be sent. For example, the incoming URL address http://www.abc.de/document1.html? ....rate=A...., describes the fact that rate A applies for the data element document1.html. In this example, the question mark marks the end of the address and the beginning of the parameter portion, and the dots stand for additional information in the parameter portion. With this rate information, the information provider can himself set his fee for which he is providing the data element. That is because if a data processing installation selects this address, the parameter portion will be sent as well, without making an additional step necessary.

[0025] It can also be advantageous to change over to the predefined telephone connection with special performance features in dependency on the incoming address. In this regard, the telephone connection has special performance features, for example, a connection with a special bandwidth, and a changeover to it will be made in dependency on the required performance features.

[0026] In an advantageous development of the method, the data processing installation designated by the second address is different from the data processing installation designated by the requested address. The fact that a distinction is made between two data processing installations during the method step for establishing the data connection ensures that existing data networks in which not all of the data processing installations make use of the method according to the invention can also function smoothly. With the conventional connecting method, the address parameters are overlooked and the connection is established with the incoming address. Take the example of: http://www.abc.de/document1.html. If the method according to the invention is being used, the second address will be generated and a connection will be made to it, possibly over a special telephone line. If the provider of the data

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element, document1.html in this case, wants to offer it exclusively under the second address, he can store a reference providing information about the method as a data element under the requested address.

[0027] In an expedient version, a setting can be made on the requesting data processing installation as to whether a second address should be generated for an incoming address. Such a step provides the user with the option of creating data connections while excluding the method according to the invention. To do that, the generation of the second address is suppressed and the incoming address is forwarded.

[0028] In an especially advantageous development of the method according to the invention, both the incoming address and the second address denote a data processing installation in a way that follows the protocol being used. If the method is not applied, a data connection can still be established with the incoming address, since it represents a valid address. The method can thus also make use of the known techniques for establishing a connection and addressing. In addition, no elements are inserted into the addresses that could hinder a relaying or forwarding of the addresses.

[0029] An embodiment in which fee recording is implemented by means of the method according to the invention as a special requirement on the data connection is shown in the following Figures. Of course, other special performance features in addition to the fee accounting can also be implemented with the method according to the invention. Shown in the drawing are:

Fig. 1   a block diagram in which a proxy server selects the appropriate connection, and

Fig. 2   a schematic diagram of the proxy server from Figure 1.

[0030] For the special demands on a data connection in the provision of Internet services, the data connection can be made through two gateways. The first gateway, via a conventional standard ISP 1 (standard Internet service provider) provides a conventional POP dial-in point (point of presence dial-in point). Here, the dial-in takes place over an analog telephone line, for example, or over a dial-up connection, such as with ISDN, GSM, ATM or ADSL, for example. As a rule, the provider of the standard ISP 1 will have concluded agreements with the user for making his services available.

[0031] A second gateway to the Internet is offered via one or more fee-based premium rate telephone numbers 5. The premium rate telephone numbers 5 represent telephone numbers of a telephone company on which special fees are charged. Usually, the fees that are charged are divided into a connection fee and a provider fee, whereby the one who is offering his service

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over the premium rate telephone number is paid at least part of the provider fee by the telephone company. The latter bills the customer by means of their usual fee recording.

[0032] If the user is connected to the World Wide Web via his standard ISP 1, he will be offered through his Internet browser a number of addresses, in the form of graphically configured elements, for example. To establish a data connection with one of the offered addresses, the user uses his Internet browser to activate such an element. A physical connection to the data element designated by the address is established with the activation of the element. The establishment of the connection is initiated by the user's PC 2 that has activated the address, and is forwarded into the Internet through the POP dial-in point.

[0033] In order to establish the special data connection over which the fee-based data elements are made available, in this embodiment the connecting device 3 on the PC 2 dials the premium rate gateway. When this is done, a connection that already exists to the standard ISP 1 is automatically disconnected – possibly after call-back – and a connection to the premium rate ISP 4 is established by dialing a fee-based telephone number 5. It is possible to provide on such a fee-based connection a disconnect device, which, in the form of a time-out device, for example, disconnects the call after a predetermined period of time has passed in which no data transmission has taken place over the connection in order to avoid the occurrence of unnecessary fees over this connection.

[0034] The decision as to which ISP has responsibility for the requested address is directly dependent on the URL destination address that arrives at connecting unit 2. As soon as the character string containing the URL destination address exhibits certain characters that tell the connecting device that a fee-based data connection is involved, the establishment of the connection is initiated and the fee-based connection – possibly after call-back – is established.

[0035] If the user calls an address that carries the feature "fee-based", and if no connecting unit that can establish a connection to the premium rate ISP 4 is present on the user's PC, the user will receive via his standard ISP 1 an HTML document with the option of loading the connecting method according to the invention in the form of a program and installing it. As soon as the installation has been completed, the requested address is converted and the fee-based connection 6 is established.

[0036] The method in the form of a program contains system variables that are set when the program is installed. These variables can be used to determine the master program from which the copy originates.

[0037] The method reads on the user's PC 2 the messages in http protocol in order to initiate the change from the standard ISP 1 to the premium rate ISP 4 and vice-versa. Other protocols, such as Real Audio, FTP, etc., for example, are converted into the particular TCP/IP data connection to an ISP. Transmission of data elements with these protocols thus assumes that the connection to the correct ISP will be made available ahead of time.

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[0038] As is shown in Figure 2, access to the premium rate ISP 4 takes place over a conventional POP dial-in point 7, which, however, can be reached only by dialing in with a premium rate telephone number 5. This makes the establishment simple and inexpensive, and makes it possible to use well-proven techniques. At the same time, as is shown in Figure 2, the gateway serves as a local web server 8 that supplies the fee-based documents. If they are exclusively fee-based, no copies of the documents exist in the freely accessible Internet. For special data connections with data elements that are not supplied on the web server 8, such as Real Audio or complex database queries, the premium rate POP dial-in point 7 offers a corresponding TCP/IP connection 9 to an external system 10. The provider of the external system can agree upon a special security protocol for a request over the TCP/IP connection 9, which ensures that a request is also made from the premium rate POP dial-in point 7 and that its fees are being billed. Alternatively, the connection 9 could also be made via a direct physical connection so that no additional precautions have to be taken. By making the data elements available on the local web server 8, the bandwidth of the data connection 6 can be fully utilized directly.

[0039] Because access to the premium rate POP dial-in point 7 takes place over the same premium rate telephone number 5 for all service providers, it is necessary to divide the provider fee paid by the telephone company among the information providers. Three connection states are recorded in order to do that:

1. Line is disconnected,
2. Line is connected and
3. Data element has been requested with connected line.

[0040] Accounting can now take place in such a way that fees are paid for all periods of time between two successive requests for data elements (connection state 3) and between connection states 3 and 1. These periods of time are credited to the particular provider of the requested data element, and are used as the basis for the accounting.

[0041] In the accounting, separate consideration must be given to the fact that it is possible that several services can also be used simultaneously. The known technique of addressing via ports is used. The apportioning of the provider fee takes place relative to individual ports and proportionally for the individual providers.

[0042] The dependency of the address on the requested address is explained in the following by way of example. In principle, when generating the second address it is possible for it to be identical to the requested address. To determine the dependency between the URL addresses, use is made of the option that exists of transmitting parameters with a URL address. For

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example, if database operator ABC offers access to his databases on a website with the domain name "Offerings.de", the corresponding URL address can look like this:

http://www.Offerings.de/ABC

[0043] If the URL address is requested by the user, a data connection to the data element with this URL address is established.

[0044] If the database provider now wants to create a special quality gateway to his database, the URL address that works with the method according to the invention in the embodiment looks like this:

http://www.Offerings.de/ABC?docu-
ment.html,rate=0.50

[0045] If this address is requested, i.e., the user activates this address by clicking on the corresponding address element, for example, the following second address is generated by the method according to the invention:

http://www.ABC.de/www.Offerings.de/0.50/docu-
ment.html

[0046] For this address, a premium rate telephone connection is first established, for example, a 0190# telephone number in Germany, to the premium rate ISP 4. The connection is made directly to the computer with the URL address:

www.ABC.de

[0047] On this computer, the following data element is now requested:

www.Offerings.de/0.50/document.html

During the request and the transmission of this data element, the provider fees for the dialed telephone number 5 are incurred. At the same time, the provider of the database knows that when the data element "www.Offerings.de/0.50/document.html" is requested, his rate, identified as 0.5 here, is being paid. It is helpful if internal access rights for individual data elements are given in dependency on the telephone connection used for the dial-in. He also knows that the

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connection originally existed to the computer "www.Offerings.de". At the same time, the provider of the database can also store a somewhat slower or cost-free demo version of the database access under the original address. Once the data element has been transmitted, connection 6 can be disconnected and the original connection established again. The syntax of the parameters for doing this is chosen in such a way that the naming of the data elements can be carried out by a simple program.

[0048] In an alternative embodiment, it is possible to ascertain the fee recording not through a telephone number with provider fees per unit of time, but rather via a telephone number on which fees are charged that can be determined individually when it is dialed. With this means of fee recording, a premium rate ISP 4 that might differ from the telephone company would be sent the accounting data of the telephone number's user. The premium rate ISP 4 allocates this to his connection data so that individual fees can be charged either through the telephone company or the premium rate ISP 4. When this is done, an exchange of accounting data can take place through regular mail so that no security problems exist whatsoever. Of course, with this fee charging fees can also be invoiced in addition to the fees already being charged per unit of time.

List of reference symbols

[0049]

1. Standard ISP
2. PC
3. Connecting device
4. Premium rate ISP
5. Special telephone number
6. Special telephone connection
7. POP dial-in point
8. Web server
9. TCP/IP connection
10. External system

Patent Claims

1. Connecting unit (3) for establishing a data connection between two data processing installations, which, in dependency on a request from a first data processing installation, establishes the connection with a second data processing installation for the transmission of

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a data element stored on it, whereby the second data processing installation and its requested data element are designated by the first data processing installation by means of an address, characterized in that an address generator is provided, which, in dependency on the requested address, generates a second address and initiates the establishment of data connection to the data processing installation and its data element designated by the second address.

2. Connecting unit (3) according to Claim 1, characterized in that at least the address generator is an integral part of the first data processing installation.

3. Connecting unit (3) according to Claim 1 or 2, characterized in that at least one leg of the data connection consists of a telephone connection (6) in a telephone network.

4. Connecting unit (3) according to one of the Claims 1 through 3, characterized in that the address generator initiates the establishment of the data connection for the second address via a predefined telephone connection (6) that differs from a conventional connection in at least one performance feature.

5. Connecting unit (3) according to Claim 4, characterized in that the established data connection utilizes the entire available bandwidth of the predefined telephone connection (6).

6. Connecting unit (3) according to Claim 4 or 5, characterized in that for the establishment of the predefined telephone connection (6), the address generator disconnects the existing telephone connection.

7. Connecting unit (3) according to Claim 6, characterized in that the address generator initiates the establishment of the disconnected connection again if no special performance feature is required for the requested address.

8. Connecting unit (3) according to one of the Claims 1 through 7, characterized in that the second address designates a data processing installation that is different from the data processing installation designated by the requested address.

9. Connecting unit (3) according to one of the Claims 1 through 8, characterized in that the second address generated by the address generator designates a data processing installation with a data element within a subnetwork (4).

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10. Connecting unit (3) according to one of the Claims 1 through 9, characterized in that the address generator contains a list that assigns to each second address at least one address that, when requested, will generate the second address.

11. Connecting unit (3) according to one of the Claims 1 through 9, characterized in that the address coming into the address generator contains information that initiates the generating of the second address and determines the second address.

12. Connecting unit (3) according to Claim 11, characterized in that the address coming into the address generator contains information concerning the special performance features of the requested data connection.

13. Method for establishing a data connection between two data processing installations, which, upon a request from a first data processing installation (2) for the transmission of a data element stored on the second data processing installation, initiates an establishment of the data connection, whereby the second data processing installation (8) and its requested data element are designated by an address, characterized in that, in dependency on the requested address, a second address is generated and the establishment of the data connection to the data processing installation (8) and its data element designated by the second address is initiated.

14. Method according to Claim 13, characterized in that the second address is generated by the requested data processing installation (2).

15. Method according to Claim 13 or 14, characterized in that the establishment of the data connection to the data processing installation (8) designated by the second address takes place at least partially over a predefined telephone connection (6).

16. Method according to Claim 15, characterized in that in the case of a requested address for which a second address is being generated, an already existing telephone connection that does not match the predefined telephone connection (6) is disconnected, and then the predefined telephone connection (6) is established by dialing a corresponding telephone number (5) from the requesting data processing installation (2).

17. Method for establishing a data connection according to one of the Claims 12 through 16, characterized in that the predefined telephone connection (6) has at least one special performance feature.

18. Method according to one Claim 17, characterized in that at least one performance feature for the data connection is determined by information in the incoming address, and the predefined telephone connection (6) is selected with appropriate performance features in dependency on the information.

19. Method for establishing a data connection according to one of the Claims 13 through 18, characterized in that a changeover is made to the predefined telephone connection with special performance features in dependency on the incoming address.

20. Method for establishing a data connection according to one of the Claims 13 through 19, characterized in that the data processing installation designated by the second address is different from the data processing installation designated by the requested address.

21. Method for establishing a data connection according to one of the Claims 13 through 20, characterized in that the second address to be generated is designated by parameters of the incoming address.

22. Method for establishing a data connection according to one of the Claims 13 through 21, characterized in that on the requesting data processing installation (2) it is possible to set whether a second address is to be generated for an incoming address.

23. Method for establishing a data connection according to one of the Claims 13 through 22, characterized in that the incoming address and the second address each designate a data processing installation in a way that follows the protocol being used.

24. Method for establishing a data connection according to one of the Claims 13 through 23, characterized in that the incoming and second addresses satisfy the http protocol and/or a protocol of an application layer.

25. Method for establishing a data connection according to one of the Claims 17 through 24, characterized in that the telephone connection with the special performance feature is disconnected if the second address does not require a special performance feature.

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26. Method for establishing a data connection according to Claim 25, characterized in that after the telephone connection with the special performance feature is disconnected, a telephone connection that existed previously is established again.

27. Method for establishing a data connection according to one of the Claims 17 through 26, characterized in that several incoming addresses are collected at a predetermined interval of time, and appropriate data connections with special performance features are established jointly for those of the incoming addresses that require data connections with special performance features.
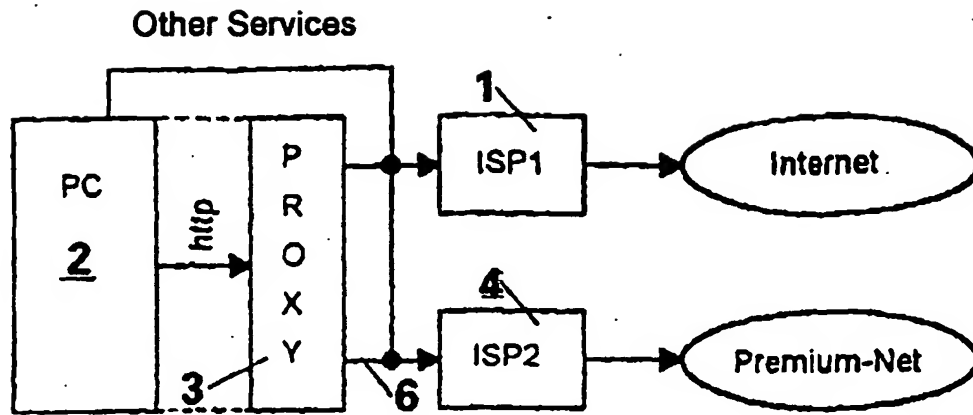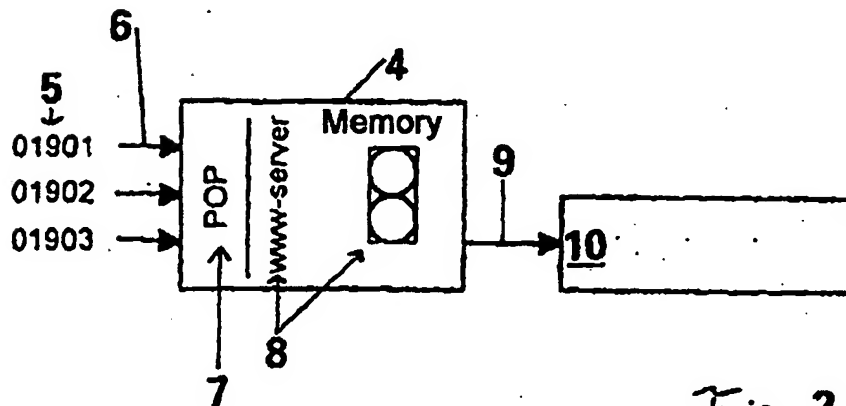
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Other Services

PC

2

http

P
R
O
X
Y

3

1

ISP1

Internet

4

ISP2

Premium-Net

6

Fig.1

6

5
↓
01901

01902

01903

4

POP

www-server

Memory

8

9

10

7

8

Fig.2